THE

OPEN-AIR TREATMENT OF PHTHISIS

Two Lectures

Delivered before the Royal British Nurses' Association

BY

W. BEZLY THORNE, M.D., M.R.C.P.

LONDON

J. & A. CHURCHILL

7, GREAT MARLBOROUGH STREET

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With the Author's Compliments.

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LECTURE I.,

Delivered November 17, 1893,

The Open-Air Treatment of Phthisis as practised at Falkenstein.

LECTURE II.,

Delivered November 10, 1898,

The Nurse's Part in the Prevention of Tuberculosis.

I.

THE

OPEN-AIR TREATMENT OF PHTHISIS

AS PRACTISED AT FALKENSTEIN
IN THE TAUNUS MOUNTAINS, GERMANY.

The degree in which the treatment of Phthisis has, up to the present time, been committed to the hands of trained nurses is small in proportion to the prevalence of that disease. The reason for this is obvious. Among the affluent classes, those afflicted with the earlier stages are properly advised to live, as far as circumstances will permit, a life in the open air. In the summer months they are able, to some extent, to comply with that condition in this country, and do so free from any oversight other than is involved in the occasional visit of a physician, and the anxious, but mostly unskilled, attentions of relatives.

The approach of our changeable and inclement winter is the signal for their migration to some southern or mountain health resort. The poor, on the other hand, mostly follow their avocations, either without medical attendance or with such as they can secure as out-patients at hospitals, until they fall into a condition which either confines them to their own homes or drives them to become in-patients, and so compels them to cast off the burden of winning bread for their families, which has long been too heavy for them.

If, however, the treatment about to be considered were to be adopted in this country, as it is in parts of Germany, and as it shortly will in Switzerland and in the neighbourhood of Paris, it would become a subject of deepest interest to trained nurses; and phthisis would perhaps be found to be as much a "nurses' disease" as typhoid fever.

In any case, a review of the special features which distinguish the open-air treatment can scarcely fail to be of interest,

and it may perhaps be found to yield some useful lessons.

In approaching the subject, and with a view to giving a general idea of the conceptions which govern the treatment, and the various minute precautions which it involves, I cannot do better than quote some of the words of Dr. Dettweiler, the distinguished and accomplished physician who presides over, and in a sense has created, the Falkenstein Establishment, as they are found in one of his published works.

"The hygienic and dietetic treatment of phthisis is based on a view of the disease according to which the organism is engaged in a conflict, and the part of the physician is to come to its succour at every point at which its integrity is threatened. That method, originating in empiricism, has received a fresh sanction through the discovery of the bacillus. The moment that it finds its way into the recesses of the body the conflict begins. The issue depends on which of the two will in the end prevail. It has been asserted that the bacillus possesses no more than a prognostic

and diagnostic interest. That is a mistake. Its discovery led to the substitution of therapeutic axioms for purely empirical aphorisms.

"Let us proceed further, and remember in what the evolution of an ordinary progressive case of phthisis really consists. The local disorder is soon followed by general phenomena. The obstacles presented to the exchange of gases in the lung involve actual changes in the blood, which are further aggravated by the advent of fever, and attain their climax when the elimination of necrosed and softened tissues is established. The fever and the blood-deterioration involve changes in the organism, more especially a diminution in the secretion of the gastric juice, whence follow difficulties of assimilation and tissue repair. Loss of vital power ensues on malnutrition. The entire muscular system undergoes deterioration, and the patient, in increasing degrees, loses both the desire and the power to take bodily exercise. Of all the muscles the heart suffers the most, and its deterioration reacts unfavour-

ably on the blood-stream and the lungs in such a manner as to allow of the bacillus multiplying its inroads. Elimination is ill performed, and finally the central nervous system shares in the universal impairment, and a general degeneration of all the corporeal elements determines the issue of the conflict. From these considerations it must be apparent that any one remedial resource, be it air, food, or drug, cannot suffice to meet the indications furnished by such a complication of lesions; for a typical case of phthisis embraces little less than the whole field of pathology. Such a condition calls for the exercise, on the part of the physician, of all the resources of his imagination, his scientific knowledge, and his faculties. It behoves him to undertake the moral education of the consumptive, for, under the circumstances, moral treatment is in no way secondary in importance to bodily treatment. The well-known optimism of the patients, their false estimate of the actual condition of their health, their lack of perseverance and of power to concen-

trate the mind and will on a definite object, all combine to create difficulties of the first magnitude. It is essential that the physician should enlighten his patient as to his actual condition and the sacrifices of inclination which it is incumbent on him to make. The revelation may possibly seriously affect his mental composure, but the hope of cure will soon suffice to raise his spirits. The truth must be told with all the tact which the special circumstances of the case may demand, and must be enforced until the patient is made to realise the share of responsibility which necessarily devolves on him. Thus enlightened and instructed he will become, first a docile instrument, and then an invaluable auxiliary."

In the same publication Dr. Dettweiler lays great stress on the fact that, in a large number of cases, a certain measure of neurasthenia is antecedent to, and concurrent with, the symptoms of pronounced phthisis, and must be dealt with by appropriate rest-treatment and the usual dietary regulations. But, in the cases under con-

sideration, he finds it necessary, for the welfare of the patient, to dispense with the generally prevalent enforcement of isolation.

From this brief review of the principles which have determined the general lines on which the open-air treatment is conducted, it will be apparent that reliance is placed exclusively on no one special resource, and that every measure which science and experience can suggest is called into requisition to contribute, each in its own degree, to the restoration of the patient's health.

Let us now glance at the local conditions under which the treatment is carried out at Falkenstein. Picture yourself standing on an undulating and varied slope about fourteen hundred feet above the sea level, and for the moment facing south-south-east. Behind, at a distance of about a hundred yards, rises, almost precipitously, a rocky mount richly wooded by beautiful trees, mostly beeches, which spring from the soil wherever they can find a foothold among the crags, and terminating abruptly at a point almost due north. Its shoulder is

crowned by the pieturesque ruins of an aneient baronial eastle, from the centre of which springs a lofty tower. On the right, or due east, rises another, but less precipitous slope, similarly clothed with trees. Between the two lies the strait into whieh converges a valley of pasture land whieh rises at an easy gradient, but presents an eminence suffieient to eomplete a chain of defenee against cold winds whieh might sweep down from the north and east. In front extends a well-kept and extensive lawn dotted with beds of flowers and summer-houses, most of whieh are so lightly poised on pivots that the pressure of a hand suffices to turn the opening from either seorching rays or chilly blasts.

The garden, sloping gently southwards, loses itself in a park of some forty aeres, beyond which the more distant view is framed on either side by the widely separated slopes of wooded hills. In the centre of the view thus enelosed, at a distanee of something under two miles, and some five hundred feet lower, stands the mounded hill of Cronberg, eovered

with the red-tiled roofs of the town of that name, and capped by an ancient keep surmounted with a tower of singular beauty. Beyond, stretches the vast plain in which lies the city of Frankfurt, and through which the river Main meanders to pour its waters into the Rhine. In the distance of the horizon may be discerned the broken outline of a chain of mountains. No words can do justice to the beauty of the scene. The northern margin of the garden lawn is bounded by the Heil-Anstalt, or Healing-Establishment of Falkenstein. That building, reared in a style which is in harmony with the surroundings, is constructed in the form of a horse-shoe, the concave or open side of which faces the lawn and enjoys an exposure of almost due south, with the slightest possible inclination to the sheltered east. On either side are annexes which are connected with the ends of the horse-shoe by means of covered galleries. The central and southern curve of the main building is provided at the ground level with a continuous

broad verandah of glass supported by light iron columns, provided throughout with sun-blinds and curtains draped between the columns. Beneath it are ranged a hundred or more of luxuriously-cushioned cane deck-chairs, and between the heads of each two is fixed a powerful burner of the Wenham class, capable of giving full illumination to those who wish to read or while away the time with reading or such games as chess and draughts. The windows of the first floor give access to a broad balcony sufficiently spacious to afford room for a deck-chair, screens, and such other articles of furniture as may contribute to the comfort of those who are not sufficiently well to avail themselves of the grounds and the walks in the adjacent plains and mountains. Each room is provided with suitable heating apparatus, as are also the various passages and corridors. A handsome dining-hall, which can be adapted to purposes of musical and dramatic entertainment, reading, music, and billiard-rooms, cloak-rooms and a postal and telegraph office, make

up the rest of the building. The western annexe contains a bath and douche establishment, a bacteriological and analytical laboratory, and residences for the married medical officers. Behind the main building, and at a short distance from it, are the dairy and stalls for milch cattle, which are subjected to periodical veterinary supervision. The entire building is provided with the most approved sanitary arrangements of English pattern, and the drainage has been planned and executed by the eminent English engineer, Lindley. An excellent supply of pure water is derived from springs which have been tapped in subterranean galleries, and is so stored as to render it secure from all possible contamination. The kitchens, still-rooms, and larders are patterns of cleanliness and good order, and the provisions they supply for the table will bear comparison with those of a good hotel.

Two rules of domestic hygiene, which, regarded, as they are, as being of supreme importance, command unquestioning and

universal obedience in the Heil-Anstalt, must not pass without notice. They are based on the recognition of the pathological importance of the presence of the tubercle bacillus in the air breathed by subjects whose acknowledged susceptibility to its noxious influence is the occasion of their having resorted to the establishment. One is, that the sound of a brush or broom must no more be heard within its walls than was that of a hammer within the sacred precincts during the building of the Temple of Solomon. All those domestic operations which in our country are comprised under the heads of dusting and cleaning must be performed with damp or wet cloths. The employment of any appliance which would cause dust to float in the air is forbidden under the heaviest penalties. The other is the absolute prohibition of expectoration, except under specified conditions, by any patient, officer, or servant within the establishment or the boundaries of its demesne. Spittoons, which are made to undergo daily a process of effectual cleansing, are distributed

throughout the building at distances of from twelve to fifteen paces, and at somewhat wider intervals throughout the grounds. To deposit in a pocket-handkerchief sputa, which would of necessity undergo desiccation and subsequent pulverisation favourable to its ultimate distribution in the air, in the form of minute floating particles, would be an offence of the gravest order. Every patient is required to carry with him a small pocket flask provided with a hermetically closing top and bottom so constructed that it can without difficulty be thoroughly cleansed. The touch of a spring causes the top to fly open to receive the intended deposit, and pressure of the lid causes it to close again with a snap. These receptacles are cleansed under a stream of water every day, and oftener if necessary. Further, it is regarded as an impropriety to cough at meal times, and few features of the establishment are more surprising than the control which the patients rapidly acquire over themselves in that respect, so that it is quite the exception

to hear the forbidden sound in the dining hall.

Such being the material provisions and hygienic rules which have been designed for the welfare of the patients, let us now turn to the manner in which the general method of treatment is carried out. It has already been indicated that, in many respects, there is no hard-and-fast general rule of therapeutic procedure. Each patient, on admission, becomes the object of profound study. In addition to the estimate which is made of his physical condition, and the careful auscultatory, analytical, and bacteriological investigation which is made as to the state of his organs, his temperament and his power of will are made the objects of studious observation. Each one has to be impressed with the importance of making himself the willing ally of those who are devoted to the daily task of leading him in the path of health restoration. Some need to be cautioned and even repressed, some to be encouraged and inspired with hope, all must be brought to recognise the value

of intelligent co-operation with those whose aim it is to regulate every detail of daily life so as to promote the one desired end. The physician must be a psychologist, and administrator, and a pedagogue as well as a therapeutist. The senior physician of Falkenstein is pre-eminently such a man. In him reason, science, and long experience are correlated into action by discrimination, adaptability, sympathy, and an unbending will. In both of the senses in which the term can be employed he is a presiding genius.

Let us now suppose that a newly admitted patient has undergone the preliminary moral and physical inquisition which I have endeavoured to describe. His diet, apparel, and regimen, as regards rest and exercise, in addition to such treatment by drugs as his condition may require, are all laid down with precision. Then comes the important question of acclimatisation; for the rule, to which exception is made only in cases of acute exacerbescence accompanied by fever, is that, except while dressing and undressing, the patient

must pass the entire day of four-and-twenty hours under the influence of fresh air. Throughout the daytime all alike are out of doors except during meal times and such intervals as may be devoted to correspondence, music, or an occasional game of billiards. Those who need the rest-treatment lie extended on the deck-chairs in the ground floor verandah, beguiling the hours with reading, conversation, or any other pursuit which is compatible with the maintenance of that position. They are, however, carefully watched. Rugs and other comforts are so arranged as to secure them from chill, and should any sense of cold be nevertheless experienced, a small quantity of warm liquid food, fortified with stimulant, is forthwith administered. One of the medical officers makes it his business, from time to time, to ascertain the temperature of the extremities, and even of noses, with a view to ensuring the due and continuous distribution of the blood throughout the system. At ten in the evening all retire to rest in rooms the windows of which are only closed while the process of undressing

lasts, and which are kept open throughout the night in all weathers, winter and summer, to a degree proportioned to the amount of tolerance which has been established. Should an access of pneumonia or bronchitis supervene in any case, the patient is confined to bed, and the temperature of the room is maintained at about 60° F., if necessary by means of artificial heat; but, even in such a case, windows are not completely closed, and a continuous flush of fresh air is maintained. Similar precautions are, when called for, taken in those cases which present the hectic fever which is so common a feature of phthisis, and such antipyretic remedies as may be indicated are employed; but, should the normal temperature not be attained within a week, the patient's bed is transferred, during the day, to the balcony. Many are, from the outset, well enough to enjoy the free range of the garden and the park, and, before long, have recovered sufficient health and power to take walks of prescribed duration in the adjacent woods and mountains. An extension of from three to five

or ten minutes each day, in many instances, converts a feeble and breathless subject into a fairly efficient pedestrian; and, towards the end of the course, not a few have recovered sufficient power to take walks extending over some hours, with obvious advantage to their health, as indicated more especially by improved appetite and powers of assimilation. It should be noted that, on either side of the general entrance to the building, are separate dressing-rooms for men and women, provided with large pigeon-holes in which are kept towels and changes of underclothing, always ready for the use of those who may return from their expeditions with a freely acting skin. The educational resources of the establishment include instruction by means of breathing exercises, more especially designed to restore the habit of inspiring through the nose, and careful injunctions calculated to avoid any undue strain on the heart. Massage also is brought into requisition in all suitable cases, more especially those which present any degree of neurasthenia. The cold shower-bath is one of the more notable

remedial features of the system, and is regarded by the patients with especial favour. Separate arrangements of dressing-rooms are provided for the sexes, both leading direct to the douche-room. The head alone is protected by means of a waterproof cap. One by one the bathers enter the apartment, and, as they do so, their names are called through a speaking-tube to one of the assistant physicians, who sits at a table on which is laid a watch provided with a second-hand. Facing him is a chart on which are inscribed the names of all the bathers, and against each name, in a separate column, one or more strokes, each of which indicates five seconds—the duration of the shower for each beginner. Above the chart projects the lever which regulates the stream of water, and, as each name reaches the physician's ear, he looks at the chart to see how long the shower is to last, and manipulates the lever accordingly. An attendant awaits the returning patient, and vigorously applies the towel. The effects of this bath in promoting tolerance of cold, in checking undue action

of the skin, and in inducing healthy tissue change and a better state of the nervous system, are very noteworthy.

It will be readily eoneeded that a life of exposure to the air, sueh as I have endeavoured to sketch, may be admirably suited to phthisieal patients during the summer months, but it would exeite no surprise if some were to entertain misgivings as to its expedieney during the inclement months of winter and early spring. That consideration aequires additional importanee when one realises what elimatic vieissitudes are neeessarily ineidental, during the colder seasons, to a mountain region whieh is not suffieiently elevated to be above the oecasional prevalenee of cloud mists in no way differing from the white fogs which so frequently visit our own eountry during the same time of the year, and the occasional inevitable oeeurrenee of heavy rains, and storms of sleet, hail, and snow. It would be better to meet such misgivings by an appeal to facts than to theory, bearing in mind that the more complieated and acute cases apply for

treatment during the winter months. The statistics collected by Drs. Dettweiler and Meissen, of conjoined relative and actual cures, show a difference of one-half per cent. as between the six months of summer and those which centre round the winter quarter, and what little difference there is, stands in favour of the winter months. The number of patients whom it is found advisable to confine to their rooms, at different times of the year, is also interesting as bearing on this part of the subject.

In January it is	...	10	per cent.
„ February	...	$7\frac{1}{2}$	„ „
„ March	...	$9\frac{1}{2}$	„ „
„ April	...	$9\frac{7}{8}$	„ „
„ May	...	$9\frac{1}{2}$	„ „
„ June	...	$7\frac{1}{5}$	„ „
„ July	...	$7\frac{1}{2}$	„ „
„ August	...	$6\frac{1}{4}$	„ „
„ September	...	$7\frac{1}{4}$	„ „
„ October	...	$9\frac{2}{3}$	„ „
„ November	...	$10\frac{1}{4}$	„ „
„ December	...	$10\frac{1}{2}$	„ „

The average for the summer months is

$8\frac{1}{2}$ per cent., and for the winter months $9\frac{1}{3}$ per cent. The difference may be regarded as insignificant. Such results may fairly be considered to raise the question of the influence of climate as it exists in regions which are subjected to neither tropical heat nor arctic cold; but the present is hardly an occasion suitable for the exhaustive examination of so important and interesting a question. They may, however, be regarded as a sufficient excuse for my referring to a few items which have been selected from statistics of death-rates of phthisis, which I owe to the courtesy of Mr. Mulcahy of the Local Government Board, and which have been calculated on the returns of the Registrar-General of England. I will, for the sake of brevity, only quote those which refer to certain typical districts, and take for example the year 1888, in which the death-rate had not been disturbed by the advent of the influenza epidemic. The areas which I have chosen for this purpose are the south-eastern district, representing a relatively dry and temperate climate; the

south-western, representing one which is mild and moist; Yorkshire, which is cold and relatively dry; and the north-western, which is relatively cold and moist. They are as follows :—

S.E.	...	1,534	per million of inhabitants.	
S.W.	...	1,456	,,	,, ,,
N.W.	...	1,649	,,	,, ,,
Yorkshire		1,561	,,	,, ,,

I cannot refrain from referring, at this point, to the differences which are presented by a comparison of the death-rates of phthisis, per million of inhabitants, between the years 1851 and 1891 in those same areas. In the forty years comprised within those dates, the actual diminutions are represented by the following numbers :—

S.E.	...	1,046	per million of inhabitants.	
S.W.	...	1,016	,,	,, ,,
N.W.	...	1,395	,,	,, ,,
Yorkshire		995	,,	,, ,,

The comparison shows that the death-rate from phthisis has, within that interval, fallen in the first-mentioned three areas to something not very far removed from one-

half, and in Yorkshire to about one-third; a result which bears eloquent testimony to the effects of improved sanitation, and, perhaps also, to those of more enlightened methods of treatment. But be that as it may, the testimony is no less significant as to the small part which climate, as far as temperature and the amount of watery vapour suspended in the air are concerned, plays in determining the incidence of the disease. Indeed, it is impossible to resist the inference that phthisis, even having due regard to the unquestioned influence of heredity, must be classed among what Sir John Simon has designated "Filth Diseases," and that it is a malady the incidence of which is mainly determined by the introduction into the organism of impurities, one of which undoubtedly is the tubercle bacillus, either by means of contaminated food or foul air; and if such be the case, a strong argument in favour of the open-air treatment, at all seasons, is established on a firm basis. That argument is still further strengthened by reference to the appal-

ling death-rates which are yielded by such places as Sheffield and the Cornish mines, in both of which the impurity of the air breathed by many members of the working classes is intensified by the addition of particles which are given off in confined spaces as the result of certain industrial pursuits. Uninteresting as statistics are generally admitted to be, I must quote one more example of the noxious influences of confined air, mental strain, and unhealthy conditions of life; more especially as I am addressing an assembly consisting largely of nurses, and having in view statements which have been recently published as to the incidence of disease and death among such aspirants to the profession of nursing, as are alleged to pursue their vocation under conditions which are not in conformity with the ascertained principles of hygiene.

It is found in the following extract from an article on consumption, which appears in the eleventh annual report of the Provincial Board of Health of Ontario for 1892:—

"Among the latest of such observations are those of Cornet, of Berlin. For the purposes of study he has taken the statistics of mortality from twenty-eight of the cloisters of Germany during twenty-five years, including brotherhoods and sisterhoods, having an average population during those years of 4,028·28. The members of those sisterhoods had, for the most part, devoted themselves to the duties of nurses. He found that the life-period of all the inmates amounted to a total of 87,450 years, or an average life-period of 21·6 years. The total deaths were 2,099, and 1,320 were persons who died of tuberculosis. In one sisterhood, having a yearly average of thirty-seven persons, there were, during twenty-two years, ten deaths, all of which were due to tuberculosis. He further found that the mortality is specially severe in the several first quinquennia of conventual life, during which the sisters were especially engaged in the more menial duties of cleaning floors, washing clothes, &c., and as compared with the whole state was re-

latively enormous. From these figures he draws the conclusion that a healthy girl entering a sisterhood at seventeen dies at 21·5 years earlier than her sister belonging to the general population of the state; and that such an inmate in her twenty-fifth year stands, in regard to the expectation of life, in the same class as a female in the outer world at the age of forty-five, and a sister of thirty-three in the same class as a female outside at the age of sixty-two."

I cannot avoid the conclusion that these figures, illustrating, as they do, the disastrous effects on young life of confinement to dwellings, of want of exercise combined with mental strain and menial work, and perhaps also a not too liberal diet, are deserving of the earnest consideration of those who are charged with the responsibility of regulating the duties and hygienic conditions of young women, and, among them, of nurse probationers.

Returning now to the therapeutic methods and precautions which are observed in the establishment of Falkenstein, and of others which are conducted on the same principle,

the question arises whether we, as trained nurses and members of the medical profession, have any lessons to learn from them. I venture to submit that they point, as already suggested, to the relative insignificance of the influence of climate as such, and to the paramount importance of a continuous supply of fresh air, both as a prophylactic and as a curative agent; to the relative, but far from absolute, insignificance of treatment by drugs and presumed specific remedies, and to the immeasurably greater value of hygienic precautions concerted, in each separate instance, to the special requirements of the patient, as indicated by constitutional condition, more especially in regard to the point of least vital resistance, and the temperament and moral fibre of the sufferer. I think also that they offer us lessons as to what may be termed specific domestic hygiene, and as to the effectual antiseptic disposal of sputa.

I must not omit to state that the proportion of complete cures effected at the institution in question, as calculated from records extending from 1876 to 1886, and

relating, for the purposes of this calculation, only to patients with whom communications have been maintained since their discharge, is 13·2 per cent. of complete cures, and of relative cures 11 per cent., making a total of 24·2. The estimation of complete cure depended, before the discovery of the bacillus, on the clearing up of physical signs, and a return to the outward appearance and active habits of healthy life; and, since the discovery of the bacillus, on the disappearance, as well, of that organism from the sputa. The diagnosis of relative cure is based on the return of a healthy appearance and condition, the restoration to healthy functions of the various organs, more especially the heart and lungs, notwithstanding the persistence of some crepitation or rhonchus in the affected area of lung substance, and of a small amount of purulent expectoration. I must also call attention to the fact that the average duration of a "cure" at Falkenstein is 142 days, while the average period required to secure a similar result in establishments conducted on

other principles is 335 days, or rather more than double.

It should be added that numerous similar establishments are in active operation in various parts of Germany, and that, after prolonged consideration and investigations carried out by medical experts, the Canton of Basel in Switzerland and the municipality of Paris have decided to found institutions for the open-air treatment, at the charge of the public funds, over which they respectively have control.

Turning to our own country, opinions may, and indeed will, be divided as to the practicability and advisability of promoting the adoption of such methods of treatment for the more opulent classes. On that point I, at present, abstain from expressing a decided opinion, although I confess that I should be glad to see the attempt made. When, however, one takes into consideration the chances and opportunities of those who have not the means of following the prevailing custom of seeking restoration by resort to Alpine and

southern health resorts, I feel impelled to express the conviction that the maintenance of such health-restoring institutions would prove to be a boon of inexpressible value, the means of preserving to their families and to the nation many precious lives, and of saving anxiety and suffering too great to be estimated. I only wish that I could hope that the powerful trade organisations, which exercise so much influence in our midst, and, at times, dispose of vast accumulations of money in furtherance of schemes which too often fail to bring happiness and comfort to the domestic hearth, could be induced to devote a portion of their funds to the maintenance of similar institutions for the benefit of the members of their several crafts and of the suffering members of their families.

II.

THE NURSE'S PART IN

THE PREVENTION OF TUBERCULOSIS.

When I was invited by the Executive Committee to repeat, as a Sessional Lecture, the one which I had delivered in the latter part of 1893, I felt that I could not consistently decline to return to the subject, having regard to the state of public opinion at the present moment, and to the fact that it is one in which all nurses must necessarily take a deep interest. But it appeared to me desirable that it should be approached from a somewhat different standpoint, and, on this occasion, be considered more from the point of view of those who may be called upon to carry out the directions of medical men in the course of a treatment which is novel in this country, but more effective than any other in checking and repairing the

ravages of a disease which, at the present time, is yearly claiming in England and Wales a sacrifice of some sixty to seventy thousand lives. That consideration becomes the more urgent when we consider that tuberculosis is not only a preventable, but, contrary to the view which has prevailed up to recent times, one of the most curable of diseases. I have a vivid recollection of the surprise with which I read, in the year 1867 or 1868, when I was preparing for my first qualifying examination, that the late Dr. Hughes Bennett, of Edinburgh, had certified that, in making *post-mortem* examinations on subjects who had died of other diseases than those affecting the chest, he had found that in some 28 per cent. the lungs presented the cicatrices of healed cavities which, without doubt, had been caused by tubercular phthisis. If, then, to the 20 or 30 per cent. of undetected cases we add the large percentage of recognised cases, it would probably not be far from the truth to say that something like half of the general population, at one period or another of

existence, has been affected with tuberculosis of the lung. Now, although for more than a generation past the Open-air Treatment of that disease has been practised in several places in Germany, and, within the last seven or ten years, has been brought into operation in Switzerland and France, it may be said that, with the exception of a few individual efforts to introduce it on a smale scale into this country within the last two years, it has remained untouched and unused up to the present day in so far as Great Britain is concerned. Notwithstanding the fact that Sir Hermann Weber urgently called the attention of the profession to that mode of treatment in his Croonian lecture, delivered before the College of Physicians in 1885, I believe that I am correct in saying that attention had not been called to it again until 1893, when I had the honour of laying it before the Royal British Nurses' Association some two or three months after my return from a residence in the Sanatorium of Falkenstein. I will not now repeat in detail what I said on that occa-

sion, as the lecture has been published in pamphlet form, and is still available to any who may desire to refer to it.* Moreover, accounts of the treatment have been given by so many other observers within the last few months that no useful purpose would be gained by detaining you with an enumeration of all its details.

Briefly, the essential conditions of the treatment are the following:—That whenever possible the rooms occupied by the patient, whether by day or night, should have the advantages of a southern aspect and the free admission of pure fresh air, ensuring the maximum amount of sunshine which the climate may afford. That from eight o'clock in the morning until the hour for retiring to rest the patient should, in all weathers, be in the open air, except just so long as may be required for meals, change of apparel, and the irreducible minimum of letter-writing. That a verandah, or summer-house, or both, should be available for out-door life when

* "The Open-air Treatment of Phthisis at Falkenstein." J. & A. Churchill.

shelter is needed from rain, hail, sleet, or snow, from high winds, and from the oppressive heat of sunshine when it becomes excessive in hot seasons. It will be a great advantage if the neighbourhood present pleasant scenery, agreeable walks, and a garden in which the patient may find an interest in some light occupation; and it is needless to add that some kind of open space, preferably a lawn with partial shelter from trees, but not shut in by dense growth, should be available for deck chairs or such other reclining couches as may be found comfortable and convenient. The object of keeping the patient in the open is that he may inhale pure and uncontaminated air with every breath drawn throughout the four-and-twenty hours. The effect of such breathing is to promote the health of the respiratory organs, to check the progress of morbid processes in the lungs, and to restrain the proliferation of those micro-organisms on which the processes of tuberculous infiltration and of suppuration depend, to ensure that the blood be fully aërated, and that, as a necessary conse-

quence, healthy tissue change, the excretion of the waste of the body, and the cultivation of a vigorous appetite should be promoted. That such results cannot be fully attained by segregating consumptive patients in the wards of a hospital, however well ventilated and with however great a cubic area of breathing space for each individual, is so obvious that the point requires no elaboration. It will become still more apparent when we come to consider, later on, the important part which dust plays in the carriage of the tubercle bacillus, and the paramount necessity of ensuring that no phthisical individual should be allowed to inhale his own breath, or that of another person, even in a diluted state. But the Open-air Treatment must not be allowed to depend alone on a continuous supply of fresh air and courting every available ray of sunshine. In order that its full efficacy may be secured, a number of secondary and scarcely less important conditions must be maintained. more especially the supply of an abundance of food both pure and nourishing. To be

pure it must be fresh and uncontaminated. In order that it may be nourishing, in the sense in which that quality is required by the phthisical patient, it must be sufficiently cooked, and mainly derived from the animal kingdom, consisting of such substances as meat, the flesh of birds and fish, milk, butter, cream, and eggs, and be tempered by such fruit and vegetables as may in each case seem desirable. Nourishment must be administered at such intervals and in such quantities as, in the opinion of the physician, may be consistent with the state of the patient's digestion for the time being.

Before we proceed further, and in order to lay the foundation of an intelligent conception of the principles on which tuberculosis, and more especially that of the lungs, may be effectually treated, it will now be desirable to allude to the manner in which that disease is conveyed to the human system. And, in the first place, it must be clearly stated that tubercle is not an inheritance, but an infection, as surely as is typhoid fever,

although it must be admitted that there are certain constitutional conditions, either inherited or acquired, which involve such a vulnerability of tissue as would predispose the subject to become infected by tubercle bacilli received into the system. But not even the most delicate individual will become subject to tuberculosis apart from the reception of the specific organism. It may be communicated by inoculation of the surface, by inhalation in air, and by ingestion in food.

First, then, with regard to inoculation. An unbroken and healthy skin is proof against invasion. The bacillus must be brought into contact with a vascular tissue; therefore, for all practical purposes, it is for the hands, when the surface has been broken by erosion from any cause, or by cracks such as may be caused by some skin affection, or by chapping in cold and dry weather, that danger exists; and even then there is no evidence that air-borne germs are capable of causing local infection. There is, however, on the other hand, abundant proof that the hands may

be infected by coming into contact with discharges containing the specific germ. The principal sources of such danger are fire-grates into which patients have expectorated. Some such discharge may not reach the fire, and, lighting on a part of the grate not sufficiently heated to ensure sterilisation, dries, is easily pulverised, and liberates the bacillus. The same may be said of hearthstones, fire-irons, and fenders. Through such agencies ward maids have been known to suffer inoculation of their hands, when breaches of the outer layer of the skin have allowed the germ to reach the underlying vascular tissue. In like manner spitting-pots, handkerchiefs, especially when the discharge has had time to dry, pillow-cases, and bed and body linen, soiled with the bowel discharges of those who are affected with intestinal tubercle, may become sources of danger. It is, therefore, of great importance that scrupulous care should be exercised and enforced with regard to the disposal of sputum and of other mucous and muco-purulent discharges. Expectoration should be

effected under well defined conditions. Every patient who is affected with tuberculous disease of any part of the respiratory organs should be provided with a spitting-flask, such as that designed by Dr. Dettweiler, which can be carried in the pocket and, after use, hermetically closed; also with spittoons containing some disinfecting fluid. Diluted carbolic acid or sanitas is to be preferred to corrosive sublimate, as the latter forms on the surface of the sputum a coagulum, which prevents the disinfectant from penetrating to the deeper parts. Sputa should never be deposited in pocket-handkerchiefs of the ordinary kind. Those made of Japanese paper, especially if impregnated with some disinfectant, such as sanitas, may, if proper care be observed, be used with safety; but once used they should not be returned to the pocket, but either burned or thrown into some receptacle in which they will remain harmless until they can be destroyed. No linen of any kind, whether used for the bed or the body, which has been in any way soiled by

infectious material, should ever be sent to a laundry until it has been disinfected by boiling or by exposure to the necessary degree of heat in a suitable disinfecting apparatus. Where patients cannot obtain or afford to purchase the paper handkerchiefs, and have neither spitting-flask nor spittoon available, a small cone of paper should be used as a receptacle, and immediately destroyed, preferably by fire.

Next as to inhalation. This mode of infection affects the respiratory tract. It is by no means improbable that unhealthy and eroded tonsils are capable of harbouring the bacillus and of transmitting it to the glands of the neck and thence to other glands, and eventually to the general circulation; but be that as it may, we know that the cervical glands are liable to become the seat of tuberculous disease in children and adults, but more especially in the former. I have, however, myself observed one well-marked instance in which infection occurred in a man over seventy years of age. Children, under certain constitutional conditions, may have, off and on

for years, enlarged cervical glands, becoming from time to time tender, and varying with conditions of health, dependent probably on meteorological and climatic conditions, on the state of the digestion, and on general hygienic surroundings, without evidence of tuberculous infection. But they are always in danger, and unhappily one sees in such subjects tubercle develop with great rapidity in one or more glands, and spread to those which are in communication with them. Similarly the larynx may become the seat of disease. But the parts of the respiratory tract which more frequently than others become affected are the ultimate bronchioles, that is the finest ramifications of the air passages, and the alveoli, the small air sacs which constitute the essential substance of the lung, and in which the venous blood is brought into contact with inspired air for the purpose of arterialisation. The bronchioles are provided neither with cartilaginous rings to maintain their patency under adverse conditions, nor with the ever-moving cilia which enable the bronchial mucous membrane to

cast out superfluous and intruding matters. It is in such delicate structures that the bacillus effects a lodgment, to become the starting-point of pulmonary tuberculosis. The healthy tubes and vigorous lungs which are daily filled, in every recess, with an abundant supply of pure fresh air resist infection. The bronchial tube which may be eroded, the passages which are not filled with fresh air, and the air sacs which are not daily brought into full expansion and physiological function, are liable to harbour the bacillus and to favour its active multiplication. It is under such circumstances that the small initial deposits known as miliary tubercles are formed. These spread by contact and continuity of tissue to adjacent parts. Infection leads to necrosis or death of the part affected, and to the process of necrosis may be added that of suppuration through the influence of pyogenic, or pus-producing, micro-organisms, and thenceforth those two kinds of germs act in alliance with each other, and in conjunction with necrosis promote the formation of lung cavities, and charge

the sputa with specific infecting material. Moreover, the blood itself may be, and often is, infected, and becomes a carrier of tubercle germs, scattering them in distant organs and tissues, where, becoming engaged in minute blood vessels, each one may form an embolus, or block, which develops into a new and independent centre of mischief; and sputum may fall into a healthy air passage, and carry infection to some other part of the lung; or, having been ejected from the windpipe, and not thrown out by the mouth, fall into the stomach, and convey disease to the digestive organs.

In the third place we have ingestion by food; and here it must be remarked that the bacillus resists the destructive influence of the gastric juice, and therefore is liable to travel to any part of the intestinal tract. Its lodgment is favoured by any unhealthy condition of the mucous membrane and of its constituent and adjacent tissues, more especially by erosion, such as occurs in the subjects of chronic catarrhal affections. The principal carriers

of infection to the digestive tract are milk, cream, butter, underdone meat, especially of the bovine kind (though mutton is not innocent in this matter), and food which, otherwise pure, has become infected by bacillus-bearing dust. It follows from what has been said, as a necessary consequence, that for all who are not in vigorous health, and especially for those who may be supposed to have inherited any predisposition, it is essential to avoid all milk, cream, and butter which cannot be regarded as beyond suspicion, either as the result of effectual sterilisation, or because it has been derived from a reliable source.

The three modes of infection which we have now passed in brief review at once suggest and, in fact, point to the adoption of a system of what may be called medical antisepticism in relation to tuberculosis. Indeed, in this and other germ-produced diseases, medical antisepsis is in no degree less important to the welfare of the patient and to the community than is Listerism in surgery. Medical and surgical antisepsis rest upon the same fundamental

principles of preventing and limiting the proliferation of germs, their distribution, and their contact with receptive surfaces, and the limitation of infection when it has taken place, as well as the destruction of the germ wherever and whenever possible, in order that parts diseased may become the seat of a process of healthy repair. The antiseptics of tuberculosis may be summed up under the heads of pure air and pure food. As regards air, it has already been intimated how vast is its importance both as a preventive and curative agent. The tubercle bacillus cannot long withstand the influence either of oxygen or of sunshine, and both combined rapidly put an end to its powers of mischief and to its very existence. Indeed, were it not so, the atmosphere of all populated districts would become a deadly poison. As it is, statistics of disease show that, subject to certain qualifying conditions of soil and climate, tuberculous disease prevails in direct proportion to the density of population, for the simple reason that the more people there are breathing within a given

space the more frequently and to the greater extent will each one inhale his own or some one else's breath. But that is not the only danger. The more dense the population the greater will be the number of bacilli which have been liberated from dry discharges and carried about in the air until their existence may be terminated by the influence of sunshine and oxygen, and the greater will also be the amount of irritating dust inhaled from day to day. These considerations show the intrinsic reasonableness and the incalculable importance of keeping tuberculous patients in the open air, and of removing them whenever possible from populous centres. Moreover, as has already been suggested, the constant inhalation of pure air, and exposure to the outer air and light, diminishes, and may eventually abolish, the vulnerability to renewed tuberculous infection of the air passages and breathing sacs of the lungs, by increasing their powers of resistance, and the repair of mischief already inflicted. Acclimatisation to out-door life also diminishes the susceptibility to chill, and to the

development of those catarrhs of both the respiratory and the digestive tracts which lay their tissues open to infection; while increase of appetite and of powers of assimilation, and the consequent enrichment of the blood stream, promote and develop all those powers which constitute what is called "vitality," and enable the patient to take such healthy exercise as may, by further promoting his health, set the seal to his recovery. Nor must it be forgotten that Open-air Treatment may be made to ensure a greater exposure to sunshine than could be obtained in an apartment. It has already been stated that sunshine is destructive to the bacillus which is exposed to its direct influence. But it has long been known that there are rays in light, not themselves perceptible to vision, whose office is not concerned with illumination. These are called the chemical or actinic rays. Their influence is not superficial, but they have the property of penetrating through solid substances. A good example of such penetration is afforded by the X or Röntgen rays, which,

as is well known, are capable of penetrating the human body and considerable thicknesses of wood and of other dense substances. It is both credible and probable that some of the solar rays penetrate the tissues of the body and exercise an influence unfavourable to the life and proliferation of the tubercle bacillus. If that be the case, sunshine must occupy an important place in the antisepticism of tuberculosis. Whether, therefore, we estimate its value from the point of view of the inhalation of uncontaminated air richly laden with active oxygen, or of the diminution and extinction of vulnerability, or of acclimatisation to changes of temperature and vicissitudes of weather, or of beneficial influences on digestion and assimilation and on increase of the capacity for exercise, we are brought to the conclusion that, whatever good effect may be claimed for other therapeutic measures or combination of methods, that to which your attention is directed under the name of the Open-air Treatment offers advantages and ensures conditions favour-

able to recovery which entitle it to a position of pre-eminence. It will also be apparent that it involves a systematic application of principles which are contrary to many preconceived ideas as to the treatment of affections of the lungs. Exclusion of the outer air, avoidance of atmospheric damp and cold, have been deeply imprinted on the popular mind as essential safeguards for every one who may have a cough or any affection of the respiratory organs. It will, therefore, be well to recognise that the practical application of the method in question may encounter innumerable difficulties and objections based on old-standing prejudices. In view of these it is essential that the hands of the physician should be strengthened, and that his monitions should be seconded by nurses who, having acquired an intelligent conception of the principles upon which the treatment is founded, and of the practical measures by which those principles can be best applied, will be willing and competent to watch carefully over the precise

and detailed execution of all instructions.

It would be impossible within the space of time which is at our disposal to mention in detail every one of the numerous precautions and devices which will demand the nurse's attention; but when once she has obtained a firm grasp of the principles of medical antiseptics, as applicable to tuberculous disease, the filling in of details will become both natural and easy. Her first care will be to acclimatise the patient according to the state of the weather and the season of the year. The bed-room window will be kept open more or less at the outset, and each succeeding night to an increasing degree. A screen of wire gauze, or muslin, fixed to the frame of the window will prevent draughts and the entrance of particles of soot and of a certain proportion of dust; and in a few days, especially in summer, the patient will be able to bear the lowering of the upper sash of the window to its full length. In the country, where French-windows may

be found, means may be easily devised of regulating and gradually increasing the distance between the two sections; and here again a muslin curtain employed at night would form a protection from draughts and from adventitious air-borne particles. Curtains in general, and other hangings, should, as far as possible, be dispensed with, and only such as can be periodically washed be retained. Every kind of shelf and cornice, the upper surface of which would form a gathering ground for dust, should be removed, or, if not capable of removal, should be kept clear of accumulations. Floors should, if possible, be polished, and crevices between the boards filled in, lest the interstices between them should harbour dust and particles of whatever, in respect of the lungs, may be called dirt. Such carpets or rugs as may be used should not cover the whole space of the floor, and should be removable, so that the boards beneath can be periodically cleansed, and the carpets themselves be easily moved in order to be shaken or beaten in the fresh air and ex-

posed to sunshine. Where the flooring is of such a nature that it lends itself to dust accumulation between the planks, it would be better to have it covered with some kind of material, such as floor-cloth or linoleum, which would lend itself readily to periodic washings; and the walls, as well as the ceilings, should from time to time undergo a cleansing process. For that reason "washing" papers or painted walls are to be preferred. In view of what has been said of the danger of dust, which even if it did not contain bacilli would consist largely of particles capable of polluting the air by decomposition, and of the irritating effects which that impurity is capable of producing upon the air passages themselves, it is obvious that brooms and brushes must never be used; damp cloths alone will meet the requirements of the case, and even they should be used in such a manner as to collect and retain the dust with a view to its removal, and not so as to scatter it. If a broom be used for the floor, it should be covered with a wet cloth, and the floor itself be strewn with damp

tea-leaves, or where they may not be available, with sawdust moistened with diluted carbolic acid or some other disinfectant. Further, the patient should not occupy the same room day and night, and whichever room be unoccupied for any portion of the four-and-twenty hours must be fully exposed to a free current of air. In many cases the patient will be unable to take exercise, and the whole of the hours spent out-of-doors must of necessity be passed in a recumbent or semi-recumbent posture. The temperature of the air inhaled is a negligeable condition, but that of the patient's body will demand close attention. The extremities must never be allowed to become cold, and coverings of rugs or blankets must be used to such an extent as will ensure a comfortable sense of warmth without producing oppression or excessive action of the skin, while the shelter of a summer-house or glass-roofed verandah should be sought during the prevalence of rain, hail, or snow. The purity of the air which the patient breathes must, for his own sake as well as that of others,

be secured by all the precautions which have already been enumerated as to handkerchiefs, spittoons, clothing, and bed-linen. Spittoons and spitting-flasks should be cleansed and washed with a disinfectant, or with boiling water, at least once daily, and the rinsings should be immediately discharged down a sink in the open-air or in a closet. It must be pointed out also that moustaches and beards are a serious obstacle to the personal antisepsis of an expectorating patient, and it would be better in many cases that they should be clipped near to the skin or entirely removed. In connection also with the subject of pure air, it is necessary to say a word as to skirts which touch the ground. They should not be tolerated as apparel for a patient or any one approaching one. It is obvious that they are liable to collect and to transfer from streets and roads particles which it is essential to exclude from the patient's surroundings. Happily the abominations called "respirators," which were formerly in general use, are now rarely seen or heard of. There

exists only one reliable filter and warming apparatus for breathing air, and that consists of the nasal passages, which, as we all know from our experience of days of fog and dust, are capable of separating from inspired air every kind of dust and dirt, and of casting them out safely isolated in the excreted mucus. Patients should, therefore, be encouraged to cultivate the habit of breathing through the nostrils both day and night.

Turning now to the subject of pure food, no difficulty need arise with regard to milk. Sterilisation may be effected with absolute certainty by a temperature of 180° F., and in a suitable apparatus it is possible to do this without producing the scum to which so many object, or in any appreciable degree altering the flavour.* With regard to cream, there are few places in which it is impossible to obtain scalded or, as it is often called, "Devonshire" cream, which has been exposed to sufficient heat for sufficient time to induce complete sterilisation. With regard to butter, the present condition of dairies and of domestic

* Aymard's steriliser fulfils the necessary conditions.

supply renders safety more difficult to attain, and in all doubtful cases it would be better to interdict the use of butter altogether and to substitute scalded cream. District nurses would of course find such a comparatively expensive precaution impossible, but there ought to be no insuperable difficulty in enforcing the sterilisation of milk, either by boiling or by the use of one or other of the now well-known and inexpensive sterilising apparatus, while clarified dripping might advantageously be substituted, among the poor, for suspected butter. Milk should be used soon after sterilisation, and in the interval be covered with a damp cloth to prevent contamination and infection. Meat should be cooked to such a degree as to bring the pink colour in its deepest parts to the verge of extinction. The whole of its substance will then have been exposed sufficiently long to heat to ensure sterilisation. Before leaving the subject of food it must be pointed out that few phthisical patients take as much nourishing food as they really require. They contend that they

eat as much as they can. That means that they take as much as they think they can, but a great deal less than they could with some forcing of the inclination. Besides, the habit of taking and digesting food is one which, given the necessary favourable conditions, can in nearly every instance be cultivated and largely increased.

One word must be added as to general hygiene. The health of the patient's skin can only be maintained by periodic washings, and it is not necessary to explain to trained nurses how, when the entire surface of the body cannot safely be uncovered at one time, it is quite possible to effect sectional washings in such a manner as not unduly to expose the patient to the cooling influences of evaporation. Those who are well enough to take exercise will, in most cases, be endowed with sufficient power of reaction to bear a sponge or shower bath. If a sponge bath be employed, it may in the first instance be given at a temperature only a few degrees below that of the body, say between 90 and 95°. It should be of brief duration,

and not preceded by the exposure of the uncovered body while a process of elaborate soaping is being carried out. A good reaction after the bath will be promoted by dissolving sufficient salt to give the bath the strength of sea water. A good rubbing with a rough towel will encourage the same desirable end, and it is a useful precaution to keep the patient standing in the tepid water until the upper half of the body has been dried and covered. The next step would be that the patient, after sponging with the tepid water, should stand up in the bath and rapidly sponge the body with water of a lower temperature, which from day to day may be further reduced, as powers of reaction increase, until it reaches the ordinary temperature of the time of the year. If this process be expeditiously performed, while the patient's feet remain immersed in the warmer water, the danger of chill is one which in most cases may be disregarded. Another point which may demand attention is that the patient should, a certain number of times in the

day, secure the full expansion of the chest in such a manner as to flood every air sac of the lungs with a tide of fresh air. If the patient have not sufficient strength to effect this inflation by walking or other exercise, he can do so by enforced inspirations, a dozen or more of which may be taken two or three times a day, according to circumstances. It need hardly be said that his surroundings, moral as well as material, should be as bright and as cheerful as possible; and in that connection you may be reminded that, in entering on the charge of a phthisical patient under this treatment, the nurse as well as the medical man may, with a clear conscience, hold out a good prospect of improvement, if not of actual cure. On the other hand, it must devolve on the nurse to bear a great part of the burden of the patient's education. His mind must be impregnated with the principles of medical antisepticism and of general hygiene, and he must be trained to apply to his case such special measures as the medical attendant may advise. All these must become the habit

of his life, to be relaxed only at such times and in such a degree as may be sanctioned by medical authority.

The sanguine disposition of many phthisical patients is such that at first they yield with difficulty to precautions and restrictions which appear to them unnecessary, and in such cases it will be the nurse's office, while holding before the invalid all reasonable hope of recovery, to keep in restraint every desire and impulse to throw aside necessary safeguards and to indulge in harmful pursuits. The nurse's influence will not be limited to the patient, unless he be separated from his friends in a sanatorium or some other institution for the reception of phthisical patients. She will have to defend him against his friends. There may be some who will not fear to rush in with confident and conflicting advice where angels would fear to tread. Everyone has a smattering of hygienic and medical knowledge, and not a few regard themselves as authorities of sufficient weight to justify their exercising an influence opposed to that of the physician.

Some would do more. Some would do less. Some would desire a wholly different course. Such friends constitute one of the patient's greatest dangers, and, difficult as it may be, the nurse can have no more important and honourable task than that of protecting her charge from such ill-advised and pernicious influences.

Yet one more word as to a special office the nurse will be able to exercise. It is one of infinite value. By educating the patient, regulating his surroundings, protecting him from injudicious and outside influence, she will, perhaps insensibly to herself, be contributing in a very material and important degree to that education of the public mind which it is essential to effect, in order that general and, if possible, national, measures may be adopted, not only for the cure, but for the prevention and ultimate extirpation of a disease which at the present moment claims more victims in civilised countries than any other, which brings in its train a measure of suffering and of sorrow, as well as in some cases personal as well as a national impoverish-

ment, which it would be beyond the powers of the human mind ever to estimate or appreciate.

Let me add one more word on a subject on which I feel strongly. In September, 1894, and again a few weeks ago, in the columns of the *Times*, as well as on two occasions in the Medical Section of the annual meetings of the British Medical Association, I have called attention to the fact that the cure of tuberculosis can only be ensured by early recognition and early treatment. Both are at the present time, for the great masses of the people, beyond the possibility of attainment. For the first it is necessary to have bacteriological laboratories, supported from the public funds, to which busy medical practitioners, and especially those employed among the poor, can send the sputa of patients for gratuitous bacteriological examination. For the second there must be sanatoria to which patients in the early stages of the malady can be committed until a cure has been effected. I will venture to say that in the majority of cases the time required

for the attainment of that happy consummation will not exceed from three to six months. A vast proportion of those affected cannot afford to provide for themselves the necessary conditions and surroundings. The work is one which lies at the doors of our statesmen, our public men, our wealthy philanthropists, and of organisations such as trades unions and friendly societies. These, working in conjunction, can provide the means of saving the greater part of the seventy thousand lives which are now sacrificed, in England and Wales alone, to the fell infection of tuberculosis. It is a work of national importance, nay, of national necessity, and one the performance of which can bring nothing less than a rich meed of honour and satisfaction to those who in any capacity may take a share in it; and I would not have you suppose that your position as nurses precludes you from playing an important part in this honourable task; for while it is the duty of nurses to second and to supplement the efforts of the medical profession to prevent

and to heal disease, it may also be their high office to become of all others the most effectual evangelists and missionaries of the Gospel of Health.

In reply to questions, the lecturer added that certain forms of respirators might be useful as means of conveying medicated inhalations to the air passages, but that the suggestion that they might serve as safeguards to the patient's companions was negatived by the strong consensus of opinion to the effect that bacilli were conveyed by pulverised discharges rather than by expired air. As to damp air, it would be admitted to the bedroom in proportion to the degree of tolerance which the patient had acquired by systematic acclimatisation, and, even in cases in which it became necessary to warm the air of an apartment artificially for the benefit of a patient affected with some acute complication, such as pneumonia or bronchitis, the outer air would not be wholly excluded at any time of the year, or in any weather, because pure damp air must be better than damp air contaminated.

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